

OAK RIDGE NATIONAL LABORATORY

Intra-Laboratory Correspondence

November 10, 1959

TO: Radioactive Operations Review Committee

RE: Minutes of Meeting Held on October 5, 1959

Members Present:	F. R. Bruce, Chairman	Also Present:	H. H. Abee
	R. L. Clark		W. E. Dunlap
	G. A. Gissel		A. B. Fuller
	J. C. Hart		R. L. Newton
	W. H. Jordan		
	R. B. Lindauer		
	E. J. Witkowski		
	F. Kertesz, Secretary		

Subject for Discussion: Gaseous Waste Disposal at ORNL (I)

Before starting the discussion of the agenda, Chairman Bruce announced that the Committee's recommendation concerning the use of an intermediate heat exchanger for waste tank cooling, in connection with the projected cooling tower at the Power Reactor Fuel Reprocessing Complex\*, was upheld after review at higher level.

In addition to the discussion of the present gaseous waste disposal practices at the Laboratory, he expressed the hope that the Committee will review also the proposed central off-gas facility, as any change might have great effect on budgeting. The problem created by the power reactor off-gases should also be included.

Witkowski described the present status of the gaseous waste disposal facilities. Unfortunately, many of the users consider the Central Off-Gas Facility an easy substitute for their obligation to clean up their waste gas stream locally. The stack facility should be considered only the second line of defense, leaving the primary job of decontamination to the condensers and scrubbers installed at the

\*See Minutes of Meeting of the Committee held on August 20, 1959, page 6.

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to the public by:

*David R. Hamlin* 11/16/95  
Technical Information Officer Date  
ORNL Site

individual plants. Only in the case of small plants, where such an operation is not economical, should the central facility undertake the main cleaning job. The gaseous waste disposal is in the charge of the same group which handles the liquid waste disposal problems, namely the Liquid and Gaseous Waste Disposal and Equipment Decontamination Group, Laboratory Facilities Department of the Operations Division. Two stacks are operated directly by this group, while the Graphite Reactor crew handles its own stack. All the three stacks are continuously monitored by the Health Physics Division. This monitoring indicates that the activity is at all times below the established standards. Samplers are being installed in the ducts, making it easier to find the responsible plant when ever the activity is increasing.

The following arrangement is used for routing the gaseous waste: Stack 3020 takes care of the off-gases from Building 3019 which includes the pilot plants and the High Level Analytical Facility. These include the air originating in the ventilation of the cells having very low or no contamination. The equipment includes three fans: One has a capacity of 22,000 cfm, removing the air from the large cells, while the second, with a capacity of 2,050 cfm serves the laboratory hoods and manipulator cells. The air from the hoods and the main cell is filtered while the air from the manipulator cells of the High Level Analytical Facility is not; however, space is provided for later installation of the filters. The whole arrangement represents a compromise between safety and economic considerations. Finally, for emergency standby service a steam driven 15,000 cfm fan which has to be turned on in Building 3019 is used. The vessel off-gas is carried by means of a 200 cfm steam jet which discharges directly to the stack without further treatment; there is however, a scrubber in the building. If desired, the off-gas can be sent to the filters of the Graphite Reactor cooling system. The bulk of activity in the stack originates in the vessel off-gas.

The Stack 3039, containing the central air cleaning facility, is provided with a 60,000 cfm fan and takes care of the cell ventilation of the cells in Building 3025. One of the fans of Stack 3039 is provided with two filters for the air passing through it. There is a separate fan for Building 4500, discharging directly to the stack, however the air is filtered at the source. In addition, a 40,000 cfm fan services the Radioisotope Area. These three fans are backed up by a steam-driven standby compressor with a total capacity of 60,000 cfm which can be used also as the emergency exhaust for ORR. The apparatus starts up automatically in case of stoppage of electricity.

Additional equipment includes an electric fan for the F3P and the Metal Recovery Plant with a steam-driven standby fan which soon will be made completely automatic. There is no filter at the stack for these fans, but F3P filters its off-gases at the source.

A single vessel off-gas fan with a capacity of 2000 cfm takes care of the facilities at the south end of the area, F3P, Metal Recovery Plant and 4500 Building. The Cottrell electrostatic precipitator is doing a satisfactory job.

The stack of the Graphite Reactor is under the jurisdiction of the Reactor Operations Department. Clark gave the details of that facility. The stack has a 5000 cfm standby fan. If monitoring data indicate that the stack is hot, a negative pressure will be maintained at the reactor. This stack also removes the off-gas of the LIIR. From the Graphite Reactor 120,000 cfm are filtered through a special filter which is 99.5% effective, eliminating particulates down to micron size. There is a 1-in. water pressure drop through the filter. The filter medium is changed on a regular schedule and not on the basis of increased pressure drop. The material is rated to withstand 250°F.

For the reactor annealing operation, it is planned to change the direction of the air flow, which now flows from south to north and then to the filter house. When the direction of the flow is reversed, the normal inlet will be blocked off, leaving a by-pass under the floor of the building. The new duct will be a permanent installation, to be used in future annealing operations.

The gaseous discharges from the HRT are under a separate jurisdiction. The 60 x 25 x 30 ft reactor cell is normally sealed by welded plates. Sampling of the hot solution is performed in special shielded cubicles. Air used for the ventilation of these cubicles is pulled through a filter by a vacuum pump. Samples are taken routinely from the stream before it reaches the filter and after it passes through. The activity level is satisfactory during regular operation but during shutdown when the main cell is opened up and the cell ventilation is tied to the same system, high activity is observed occasionally on the discharge side of the fan.

Fuller and Dunlap discussed the flow diagram of Stack 3039 where filters and a Cottrell precipitator are used at the present time. This facility will take care of Building 4505 and 4507, the Hot Pilot Plants in Building 3019, Buildings 3001 (Graphite Reactor), 3003 (Fan House), 3026-C and -D (Radioisotope Development Laboratory and Reactor Fuels Dismantling), 3505 (Reactor Fuels Reprocessing Plant), 3585 (the new High Radiation Level Experimental Laboratory, and the WC-2 Tank Farm. A 1600 cfm capacity fan serves as standby. The future Power Reactor Fuel Reprocessing Facility is expected to contribute up to 500 cfm, while the F3P's current waste stream amounts to about 600 cfm.

At present, most of the pilot plants are not connected directly to the Cottrell precipitators, a more satisfactory collection of particulate matter is expected when the precipitator system will become operative. The radioisotope development facilities,

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Transuranium Laboratory and the High Flux Isotope Reactor and future expansion will be taken care by the above-mentioned new system. The present duct will be divided between the existing equipment and new equipment to be installed. An auxiliary scrubber will be also available to allow for repairs without shutdown.

The wet cleaning method is divided in several stages: Hot material will be jetted from the underground pits, going through two sets of fibers and a demisting stage. The efficiency is expected to be very high, as it is hoped that more than 99% of the micron size material will be retained on the filters. A novel filter, consisting of silver-coated copper mesh is expected to remove the iodine. The filters, although not the fans themselves, will be placed behind shielding, and the whole operation will be automatically controlled. Alarms will indicate the source of faulty operation. The fans will be located in Building 3035, adjoining the cleaning element. The filters will be checked individually by the Inspection Department after delivery in order to discover defects which might reduce its effectiveness. The setup will be similar to the experimental arrangement tested successfully at Los Alamos and at Portsmouth.

Hart attracted attention to danger presented by particulate matter. As far as actual concentration in the atmosphere is concerned, there is no evidence that the Laboratory is not safe but the effects of a single hot particle lodged in the human body cannot be evaluated statistically at the present time.

A dilution factor of 1000 is accepted at the present time. The activity of the off-gases will be monitored at the stack and the ground maximum is expected to be always one-thousandth of the level at the stack. Taking in consideration the prevalent winds, the actually observed ground maximum will probably be one-third of that value.

Discussion of this subject will be continued at the next meeting of the Committee.

Documents Submitted: "Radioactive Waste Management at ORNL," by F. N. Browder, ORNL-2601.

Drawing No.	D-35686	D-35692
	D-35687	D-35693
	D-35689	D-35695
	D-35690	D-35696
	D-35691	D-35702

Radioactive Operations Review Committee  
Minutes of October 5, 1959

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November 10, 1959

Submitted by:

Francois Kertesz  
Francois Kertesz, Secretary  
Radioactive Operations  
Review Committee

FK:lsf

Distribution:

H. H. Abee  
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R. L. Clark  
G. A. Christy  
W. E. Dunlap  
A. B. Fuller  
J. C. Hart  
W. H. Jordan  
F. Kertesz  
R. B. Lindauer  
R. L. Newton  
A. M. Weinberg  
C. E. Winters  
E. J. Witkowski

OAK RIDGE NATIONAL LABORATORY  
Intra-Laboratory Correspondence

November 10, 1959

TO: Radioactive Operations Review Committee

RE: Minutes of Meeting Held on October 19, 1959

Members Present: F. R. Bruce, Chairman  
R. L. Clark  
G. C. Cain  
J. C. Hart  
W. H. Jordan  
R. B. Lindauer  
E. J. Witkowski  
F. Kertesz, Secretary

Also Present: H. H. Abee

Subjects for Discussion: 1. Fracturing Experiment Involving the Use of Cesium-137

Chairman Bruce recalled that recently the Committee approved the hydro-fracturing experiment presented by W. de Laguna, with the proviso that Lindauer, being experienced in high-pressure experimentation, should examine the proposed arrangement and should report back his observations to the Committee.\* In his recent memorandum Lindauer reported that he checked the experiment and found it satisfactory.

Document Submitted: Memorandum by R. B. Lindauer to F. R. Bruce, dated October 15, 1959 on the subject: "Health Physics Fracturing Experiment."

2. Potential Radioactive Hazards in the Planned  
Darex-Sulfex Head End Process

The Criticality Review Committee approved the above process from the viewpoint of criticality hazards but recommended that this Committee should evaluate the containment of radioactive materials which could be released as a result of an accident.\*\* Consideration of this subject was postponed until the necessary calculations are completed.

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\* Radioactive Operations Review Committee, Minutes of Meeting held on September 30, 1959, page 3.

\*\* 1. Memorandum by Dixon Callihan to C. E. Winters, dated October 14, 1959, on the subject, "Criticality Review of Power Fuel Reprocessing."  
2. Minutes of the Meeting of the Criticality Review Committee, held on October 14, 1959.

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to the public by:

*David R. Hammon* 11/16/95  
Technical Information Officer  
ORNL Site Date

November 10, 1959

3. Recent Release of Radioactive Waste into the Pits\*

Jordan expressed concern over the large amount of activity dumped into the pits during the past month, reaching half of the total for all the previous years of operation of the pits. After comments by Bruce and Hart concerning calculations in progress, it was agreed to postpone detailed discussion of this subject until October 26.

4. Gaseous Waste Disposal at ORNL (II)

In order to evaluate the off-gas handling practices, Bruce thought that it would be desirable to obtain a complete inventory of the gases handled at the various discharge points. Witkowski emphasized strongly the unavailability of an overall inventory control system as the amount of material to be discharged changes often abruptly without previous notice, according to the operator's need.

Hart recalled the discussions of a recent conference on the Environmental Control of Plutonium Hazards in Los Alamos, attended by interested representatives of the national laboratories, AEC contractors, officials of the New York Operations Office and the Public Health Service. The general consensus was reached by the participants that plutonium presents the main health problem. Total containment was strongly recommended as little trust was expressed in filters or in the results of air sampling, in view of the fact that a 15 cubic feet of sample can hardly be representative of a total discharge of about a quarter of a million cubic feet of off-gases. It is extremely hard to know what goes out the stacks and even the allowed tolerable level of 50 microcuries/day of plutonium might cause trouble because once it reaches the atmosphere, it is out of control and the prevalent winds might carry it anywhere. The particles present a special hazard which is hard to evaluate and so a mere collection of data can be quite meaningless. The general philosophy on atmospheric pollution by particles should be - not to pollute!

Although he admitted the difficulty of evaluating the hazards connected with radioactive particulate matter in the atmosphere, Jordan was still interested in reviewing whatever numerical figures are available with reference to gaseous waste discharge by the Laboratory, just as it was done in the case of the liquid waste disposal.

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\* Memorandum by W. H. Jordan to F. R. Bruce, dated October 16, 1959.

Abee described the currently used monitoring techniques. The stacks are checked continuously and the results are reported daily to Witkowski. Taking in consideration the dilution after discharge, the data were found to lie in general below the maximum permissible values, although in a few cases these values were very slightly exceeded; however, even these somewhat higher readings did not present a health hazard. No problems were encountered with the Graphite Reactor stack only occasional ones with the Isotopes stack.

The collected particle samples are studied by means of autoradiography for the purpose of discovering the problem, rather than to evaluate the hazard. The number of disintegrations per second was correlated to a given particle size and so too small particles can be safely disregarded.

Hart mentioned that potentially exposed persons are checked at the dispensary--no significant quantity of iodine was found in the thyroids of such persons during these checks.

Bruce pointed out that at Hanford it was found necessary to keep the released iodine to one-six thousandth of the permissible value in order to avoid contamination of the crops. He wondered whether a similar situation exists also at the Laboratory. According to Hart, the limnological work of Dr. J. S. Olson indicates that there is no iodine problem at the Laboratory. He is studying this problem in the immediate neighborhood of the Laboratory and is also attempting to determine the effect of the local operations at a certain distance from here. In addition, stack monitoring is performed by means of charcoal traps. By filtering the off-gases, only the noble gases and 5% of the iodine are allowed to escape. The remainder of the iodine and the noble gases are retained by another trap, thus allowing a complete monitoring of the stacks. The noble gases do not present an internal irradiation problem, although of course they have to be taken in consideration as an external hazard.

Bruce proposed to postpone final discussion of the stack monitoring problem until later when numerical data can be presented to the Committee

Abee described the three sets of stations used for the study of particulate matter: (a) the local system at the Laboratory proper; (b) stations in the vicinity of the Laboratory, circling it at distances ranging from 2 to 7 miles and finally (c) remote locations, located on a circle with a radius of 35 - 40 miles from the Laboratory. The local and nearby stations indicate the immediate fallout hazard, while the remote locations are used for establishing the background and for the evaluation of the hazard in case of a reactor accident. The data obtained are reported periodically through the regular Laboratory quarterly and annual reports. The data are variable-- in view of the great sensitivity of the monitoring stations, the effects of weapons testing in the northern hemisphere are picked up, including the Russian tests. If significant levels are indicated, the data are studied more carefully.

As to the actual experimental methods used, the particulate matter is collected in trays on a sticky paper surface. First autoradiographs are taken of the trays, then the activity of the whole trays and of individual particles are determined, by ashing it and measuring the counting rate of the ashes. From this it can be determined whether the amount of material falling out per square foot of area is within tolerable limits. Air samples are also taken through filter paper, referring specifically to the air that is breathed in by people. Finally, rain water samples are collected and measured, establishing the amount of the soluble radioactive material.

Study of these samples by counting and by gamma-spectrometer allows to determine the nuclide present and thus helps to pinpoint the source of the contamination within the Laboratory. The trends are followed from week to week by means of IBM cards onto which all the data are transferred and are given in the annual reports required by AEC regulations, summarizing the averages per station, for a given date, and for the system. These figures are interesting but not necessary very meaningful for this Committee.

It can be stated that the MPC for air is not exceeded, but rather than to be tied to specific numbers, Hart indicated that the Health Physics Division's stand will continue to be reliance on total containment of particulate matter, whenever the off-gases contain a potentially dangerous component. In his opinion, the establishment of a complete off-gas inventory for the whole Laboratory is more important than perusal of current figures.

In comparing the status of the gaseous waste disposal at the Laboratory to that at Hanford or Savannah River, Abee stated that the Laboratory practices are at least as good or better in this regard as those of other installations. Hart added that the situation at ORNL is better than at Y-12, where on several occasions the measured figures were very close to the MPC values.

Jordan wanted to know whether every operation at the Laboratory is uniformly well below the MPC value. It was brought out that occasionally some pilot plant operations exceed the desired level but they were always below the set maximum limit. The general philosophy followed requires that no single installation should contribute more than 10% of the total activity.

Clark described the method of checking the body burden by urine analysis: persons who handle hot materials are checked frequently; reactor operators are checked on a less frequent basis, while random sampling of the Laboratory personnel establishes the background body burden. Results of this sampling are in general satisfactory.

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About 600 curies of argon-41 are released daily by the Graphite Reactor but in view of the short half-life of 1.3 hours of this nuclide, there are only 80 curies of  $A^{41}$  anywhere in the world, attributable to the operation of this reactor. It is difficult to compare data because none of the atomic installations does a completely satisfactory and easily comparable job on stack discharge analysis. More information is needed on krypton, cobalt and strontium concentrations.

Jordan and Bruce repeated their interest in obtaining numerical data on the atmospheric contamination, before formulating an opinion on the subject. It was agreed to continue the discussion at the meeting in two weeks.

Documents Submitted: "Radioactive Waste Management at Oak Ridge National Laboratory," ORNL-2601, compiled and edited by F. N. Browder.

Submitted by:

Francois Kertesz  
Francois Kertesz, Secretary  
Radioactive Operations Review  
Committee

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Distribution:

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C. E. Winters  
E. J. Witkowski

OAK RIDGE NATIONAL LABORATORY

Intra-Laboratory Correspondence

November 10, 1959

TO: Radioactive Operations Review Committee

RE: Minutes of Meeting Held on October 26, 1959

Members Present:	F. R. Bruce, Chairman	Also Present:	K. E. Cowser
	R. L. Clark		D. J. Jacobs
	W. Y. Gissel		K. Z. Morgan
	J. C. Hart		E. G. Struxness
	W. H. Jordan		
	R. B. Lindauer		
	E. J. Witkowski		
	F. Kertesz, Secretary		

Subjects for Discussion: 1.) Direct Use of Cooling Tower Water for Waste Tank Cooling

Chairman Bruce announced that the recommendation of the Committee requiring the use of an intermediate heat exchanger\* was accepted by management after the question was reviewed.

2.) Final Recommendation on Liquid Waste Handling Practices

In his recent memorandum, C. E. Winters accepted the Committee's final recommendations, assigning the responsibility for implementing them to the Operations Division. A misunderstanding seems to have arisen concerning Point 6 of these recommendations, as was stated in a memorandum by J. C. Hart. It will be attempted to resolve the differences of opinion by personal discussions and if they still persist, the individual view points will be expressed in separate formal opinions. Bruce urged members to take positive stands and to make recommendations for action on the question which are referred to the Committee.\*\*

\*Radioactive Operations Review Committee, Minutes of the Meeting Held on August 27, 1959.

- \*\*1. "Final Recommendations of the Radioactive Operations Review Committee on Liquid Waste Handling Practices at ORNL," dated October 14, 1959.
2. Memorandum by C. E. Winters to J. A. Cox, entitled "Radioactive Operations Review Committee, Recommendation on Liquid Waste Disposal," dated October 19, 1959.
3. Memorandum by J. C. Hart to E. J. Witkowski referring to the above memorandum, dated October 22, 1959.

This document has been approved for release  
to the public by:

*Daniel Hamm* 11/16/95  
Technical Information Officer Date  
ORNL Site

3.) Recent Release of Radioactive Waste into the Pits\*

Witkowski reported that the total activity released to the pits amounts to 369,000 curies, of which 166,000 were dumped during the second quarter of this year. Most of this latter amount came directly or indirectly from the Hot Pilot Plants. The F3P facility was supposed to rework this liquid but its schedule did not allow it and therefore the hot liquid was sent to the waste disposal. Once this hot liquid reaches the waste system there is not very much that can be done with it: it may be held up for a limited time in the tank but ultimately it must be released to the pits.

The waste stream is always made basic prior to being sent to the concrete tanks in order to protect the integrity of the vessels and of the lines.

If so instructed, it is possible to keep this hot material in the tanks for as long as a year, but it is a moot point whether keeping it in tanks is really safer than transferring it to the pits. The uranium waste tanks could be converted for storing chemical waste once the tanks of that system are full; however, in that case all the hazardous material is kept right in the midst of the Laboratory at the tank farm. In addition, the radioactive heating problem must be also considered: thermocouples in these tanks indicated liquid temperatures up to 95°F. The energy released reaches about 5 watts/liter and may cause ultimately the rupture of the concrete tanks.

As to the volume of this relatively high level material, Lindauer reported that of the 10,000 gallons of liquid released daily to this system, about 3400 gallons originate in the hot pilot plants in Building 3019 and another 600 gallons of somewhat lower level liquid comes from the Metal Recovery building. About 10% of this material is really strongly active, reaching 10<sup>9</sup> counts/min. There are no facilities available to concentrate the rest by evaporation. All of this material is released to the pits, only the uranium waste stays a long time in the tanks.

Jordan summarized the present situation by stating that ways must be found to dispose of large volumes of this relatively high-level material as no relief is in sight concerning the reduction of the waste in the future.

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\* See Minutes of Meeting Held on October 19, 1959

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Cowser reviewed the situation at the pits by presenting a graph summarizing the various radioactive species released to Pit 3 from 1957 until September 1959 (see Appendix), including the activity levels of the most important fission products, ruthenium-106 and strontium-90. For both of these isotopes, the activity level increased from several units of  $10^5$  counts/milliliter/minute in 1957 to a value between  $10^6$  -  $10^7$  c/ml/min in the fall of 1959. Some of the  $\text{Sr}^{90}$  was retained at the tank farm; however, this is dependent on the operating practice followed, as the material is not deliberately settled out there. During the month of September the amount of ruthenium going to the pits increased from about 47,000 curies to about 162,000 curies, part of which was  $\text{Ru}^{103}$ . Decay was not taken in consideration in computing these figures. The graph indicated that through 1958, 22,000 cumulative curies of ruthenium were released, reaching 162,000 curies by the end of September 1959, including  $\text{Ru}^{103}$ . Although the ruthenium went up by a factor of 10 and will do so again if the present rate is maintained, this element is not the most important from the point of view of radiation hazard, the strontium-90 is more dangerous. In 1957, from sources other than the process waste system, 58 curies of ruthenium were discharged to the river and only 2 curies originated in the process waste system. During that time curies of ruthenium left the pit area and are held in the bed of White Oak Lake.\*

Although this level is acceptable, Bruce and Jordan expressed concern about a potential ten to hundredfold increase in the future. Morgan commented that currently strontium is the chief problem but agreed that a sizeable increase in the ruthenium level will bring this element also to a dangerous level. Perhaps steps should be taken to remove this element prior to sending the waste to the pits. Assuming that the level and flow rate will be at the same high level as during these past months, Cowser stated that the total of 5 million gallons per year will result in 1 million curies, or a factor of more than 100 compared to 1957. Jacobs pointed out that this is a limiting case, being based on the assumption that all the ruthenium comes from the waste pits.

Jordan expressed the thanks of the Committee to Cowser for assembling these figures on such a short notice and suggested that rather than making recommendations based on incomplete data, the final discussion and formulation of recommendations should be postponed for several weeks until all of the necessary data are collected and organized.

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\* Part of this subject was covered in Cowser's previous discussion reported in the Minutes of this Committee, held on August 17, 1959.

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Witkowski warned the Committee that the situation will probably get worse rather than better. The Process Waste System is now obliged to accept material dumped indiscriminately into it and, in his opinion, this situation cannot be continued indefinitely. Provisions must be made for spill, and for the additional contamination which will be caused by the cleaning up of the dirty storage canals. The present operational methods definitely should be revised.

Morgan expressed the concern of the Health Physics Division management with the activity level in the Clinch River, particularly in the stretch between White Oak Lake and K-25. As long as this area is considered as the environment of the Laboratory, we are on safe ground but if this area is referred to figures established for the population at large, then the MPC values are exceeded. This is the reason for trying to reduce the amount of strontium released to the waste system.

#### 4.) Waste Disposal Pits

Cowser mentioned that from past experience it is known that the radiation level at the pit area is highest when the water level is allowed to go down. Under the worst conditions, extremely low liquid level and high-activity waste stream, the level may reach 1500 mr/hr at the road. He did not know the radiation reading at the gate which may be reached by the general public. Hart emphasized the importance of the gate as a barrier which keeps unneeded personnel and visitors away from the dangerous location, although he agreed that the present system is not perfect.

Bruce brought up the desirability of covering the pits with a screen as was brought out in previous discussions. Morgan was opposed to this if it means that workers must be exposed to radiation above the 3 rem level during the completion of this work. In his opinion, the net is important primarily as a public relations gesture, as the ducks will not get too much irradiation during their short rest on the water. The chief hazard is in the radioactive silt. On the other hand, the air-borne activity in the neighborhood of the pits does not present any special health hazard.

Cowser did not have formerly unreported data available concerning the concentration of the various elements in the seeps, as the analyses were not yet completed in the Low Level Laboratory. It will take a certain amount of time before the recent additions to the pits will be noticed in the seeps, as the travel time from Pit 3 to the seep is about 50 to 100 days and from Pit 4 about 20 days. The new analytical procedures allow the investigator to notice a twofold increase over the background, so the anticipated 200 fold increase should be easily detectable.

November 10, 1959

Morgan stated that there is no strong reason to abandon the pits right now. In his opinion pits are better than tanks and the pits should be abandoned only after better ones are built. Prevention of contamination by strontium-90 is the chief problem in that area.


Submitted by:

Francois Kertesz  
Francois Kertesz, Secretary  
Radioactive Operations  
Review Committee

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Distribution:

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E. J. Witkowski  
C. E. Winters



January 27, 1960

To: A. M. Weinberg

From: F. Kertesz

Appendix to Radioactive Operations Review  
Committee Minutes of Meeting Held on  
October 26, 1959.

